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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,356	01/19/2006	Thomas J. Buller	CH2852USPCT	3787
7590 E I du Pont de Nemours & Company Legal Patents Wilmington, DE 19898			EXAMINER NGUYEN, NGOC YEN M	
		ART UNIT 1754		PAPER NUMBER
			MAIL DATE 06/29/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/538,356	BULLER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ngoc-Yen M. Nguyen	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is **FINAL**.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1-28 is/are rejected.
- 7) Claim(s) \_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_

### DETAILED ACTION

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuill et al (2001/0021360) in view of Becker et al (6,277,354).

Yuill '360 discloses a process of the present invention for reacting a high flow rate of a gaseous reactant which can contain or pick up solid particles in a tubular reactor is comprised of the following steps. The gaseous reactant to be injected is swirled in a first annular plenum chamber followed by a second larger diameter annular plenum chamber. The swirling gaseous reactant is then introduced into the reactor by way of two or more radial slots communicating the reactor with the outlet of the second plenum chamber whereby solid particles carried with the gaseous reactant are caused to flow into the reactor with the gaseous reactant and are not trapped in the first or second plenum chambers. The radial slots bring about the uniform distribution and alignment of the flow of the gaseous reactants and solid particles through the center of the reactor and thereby prevent incomplete mixing and erosion therein. In the production of titanium dioxide, the above described process is preferably utilized for injecting high flow rates of heated oxygen into the reactor (note paragraph [0010]).

In FIG. 1, the apparatus of this invention is illustrated in combination with a tubular reactor for producing titanium dioxide from heated oxygen and heated titanium tetrachloride gas streams which can contain or pick up particulate solid contaminants and which are injected at high flow rates into the tubular reactor. The tubular reactor can be of any known reactor design including those that are cooled with water or other heat exchange medium, those which are not cooled, those that are formed of a porous medium, etc. (note paragraph [0024]).

As shown in FIGS. 1-4, the apparatus 12 is comprised of a cylindrical gaseous reactant injection chamber 16 having an annular opening 17 around the periphery thereof and flange connections 18 and 20 connected to the forward and rearward ends 19 and 21 thereof, respectively. A closing flange 22 is attached to the flange 18. A conduit 24 is sealingly connected through the flange 22 and extends into the cylindrical injection chamber 16. The conduit 24 is positioned coaxially with the cylindrical injection chamber 16 and a second conduit 26 which is also sealingly connected through the flange 22 is coaxially disposed around the conduit 24. An inlet flange 28 is connected to the conduit 24 and a flanged inlet connection 30 is connected to the conduit 26. As indicated in FIG. 1, when the gaseous reactant introduction apparatus 12 is utilized with a water cooled titanium dioxide production reactor, a source of auxiliary fuel, e.g., methane, propane or toluene, is connected to the inlet connection 30 of the conduit 26, and a source of reactor scouring medium is connected to the inlet connection 28 of the conduit 24. The auxiliary fuel is utilized to provide additional heat and to stabilize the oxidation reaction in the reactor 19. The fuel is oxidized to carbon dioxide and water

Art Unit: 1754

and the water formed promotes rutilization which improves the properties of the titanium dioxide produced. The reactor scouring medium which can be sand, rock salt, sintered titanium dioxide, compressed titanium dioxide or the like is injected into the reactor apparatus to scour titanium dioxide from the cooled walls of the reactor. As the titanium dioxide is formed in the reactor, some of it deposits on the walls of the cooled portions of the reactor, e.g., the part of the reactor cooled by water or other means. Unless removed, the titanium dioxide will continuously build up and substantially interfere with the cooling process. Thus, the scouring medium must be continuously introduced into the reactor.

For the amount of scouring medium used, the velocity of the flows, the ratio of the velocities, the temperatures, etc., it would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215.

The difference is Yuill '360 does not specifically disclose that iron chloride is used as the reactant.

It should be noted that the teaching of Yuill '360 should not be limited to the exemplified reaction between titanium tetrachloride with oxygen to form titanium dioxide because Yuill '360 does teach that the process relates to processes and apparatus for reacting high flow rates of gaseous reactants containing particulate solids in tubular reactors in general (note paragraph [0003]).

Becker '345 discloses a process for the oxidation of metal chlorides and recovery of chlorine in which the formation of wall deposits are minimized or controlled (note column 2, lines 14-18) and the metal chlorides include iron chloride or complexes of iron chloride with sodium chloride (note column 4, last paragraph).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use of the process of Yuill '360 to form iron oxide from iron chloride, as suggested by Becker '345 because the process of Yuill '360 would minimize the build up of deposits of solids on the reactor walls.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*Ngoc-Yen Nguyen*  
Ngoc-Yen M. Nguyen  
Primary Examiner  
Art Unit 1754

nmm  
June 25, 2007